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THE ROLE OF USDA IN INTEGRATED PEST MANAGEMENT

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A few years ago, when life was much simpler than it is today, there were really only two subjects that were guaranteed to raise an argument -- politics and religion.

Now, one is lucky to find two topics that won't create a controversy -- and pesticides certainly isn't one of them.

The U.S. Department of Agriculture has been in the eye of this controversial storm since the early days of DDT and Rachel Carson's "Silent Spring."

That's understandable because the Department of Agriculture has oversight responsibility for over 187.6 million acres of Federal forests and 350 million acres of cropland -- both are major users of pesticides, particularly agriculture.

Chemical technology has revolutionized agriculture in the past generation.

Since World War II, U.S. farmers sought to increase yields in relation to costs. To accomplish this, hundreds of chemicals were used to increase productivity, protect crops, and decrease labor requirements.

In the beginning, at least, too little thought was given to the eventual consequences to the environment and to people. Side effects and long-term impacts of the chemicals were unknown or ignored.

Remarks by Dr. M. Rupert Cutler, Assistant Secretary of Agriculture for Conservation, Research, and Education, at the Symposium on Pest Control Strategies -- Understanding and Action, Cornell University, Ithaca, New York, June 22, 1977

It didn't take long before the inevitable controversy occurred and the push-and-shove between farmers and chemical suppliers and environmentalists often became bitter.

Clearly, chemicals are essential to the maintenance and increase of agricultural production. The problem is: How are farmers to use these chemicals with least adverse impact on the environment? The present solution largely resides in the regulation of the use and application of these materials. In most cases, the trade-off, so far, has pleased neither farmers nor environmentalists.

In his environmental message to the Congress, President Carter acknowledged that for several decades chemical pesticides have been the foundation of agriculture, public health, and residential pest control. He also expressed concern that of the approximately 1,400 different chemicals used in pesticide products, some, as we have begun to discover, impose an unacceptable risk to our health and our environment. To improve the safety and effectiveness of pest management, he asked the administrator of the Environmental Protection Agency to work with the Congress in enacting amendments to the Federal Insecticide, Fungicide, and Rodenticide Act which would allow the EPA to regulate directly these 1,400 active chemical ingredients, rather than the 40,000 different commercial products which contain them in varied amounts. This change would help speed the registration of safe and desirable pest control products, and it would permit swifter revocation of registration for those which pose unwarranted risks.

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He also instructed the Council on Environmental Quality at the conclusion of its ongoing review of integrated pest management in the United States to recommend actions which the Federal Government could take to encourage the development and application of pest management techniques which would emphasize the use of natural biological controls like predators, pest-specific diseases, pest-resistant plant varieties, and hormones, relying on chemical agents only as needed.

In this message the President is reflecting the concerns of the American public. The people of this country are not only highly aware of the environment and its complexities and have a real appreciation for the benefits of diversity of species, but they also have a real concern for the impact on nontarget species, including man, of the over one billion pounds of pesticides this country knowingly releases each year into the environment.

Dr. William D. Weil, Jr., professor and chairman of the Department of Human Development at Michigan State University, provided us with an excellent example of this dilemma in a statement he made recently before a Senate subcommittee in Washington. His testimony was related to recent reports by the Environmental Defense Fund and the Environmental Protection Agency that human breast milk increasingly contains pesticide residues and other chemical contaminants that can cause cancer and other diseases. Dr. Weil stated, "Of immediate concern to all of us is what do we say to a woman who asks: 'Should I breast feed my baby under these circumstances?' " Weil testified, "I have no easy answer. I really don't even have a good complicated answer."

The economic picture is also changing. The cost of pesticides and their application has increased dramatically in the last ten years. The price of oil and other petroleum products is increasing while supplies are decreasing.

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Because of the widespread unemployment, a large workforce is available for use in places where it hasn't been in the past. If we're smart enough to utilize it, this situation gives us the opportunity to use "people-power" rather than chemicals in some of our pest management efforts, as well as the opportunity to provide meaningful jobs to people who need them.

All of these points and many others support the President's statement that now is the time to take a new look at the way we protect our crops and other resources from pests.

Key Considerations of Integrated Systems

As I prepared for this presentation, I was surprised at the number of different concepts and definitions that are currently in use. One of the better definitions described integrated pest management as an approach that employs a combination of techniques to control the wide variety of potential pests that may threaten crops. It went on to say that an integrated system involves maximum reliance on natural pest population controls, along with a combination of techniques that may contribute to suppression -- cultural methods, pest-specific diseases, resistant crop varieties, sterile insects, attractants, augmentation of parasites or predators, or chemical pesticides as needed. It emphasized that a pest management system is not simply biological control or the use of a single technique. Rather, it is an integrated, comprehensive approach to the use of various control methods that takes into account the role of all kinds of pests in their environment, possible interrelationship among the pests, and other factors.

One of the key factors that is omitted from most of the definitions is that integrated pest management must be an integral part of total management

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-- whether it be for row crops, forest resources, or whatever. Another point that deserves special emphasis is that a truly integrated pest management system requires real multidisciplinary participation, not only in the research and development phases but also in their actual implementation on the ground.

USDA Policy on Pest Management

The Department's current policy on pest management is incorporated in its programs for environmental quality. This policy states that "the Department of Agriculture recognizes that the activities associated with agriculture and forestry and the quality of the environment cannot and should not be separated. It is therefore the policy of this Department, while pursuing its basic agricultural and forestry responsibilities of insuring adequate supplies of food and fiber, to support programs which encourage favorable and responsible relationships between man and the environment; to encourage meaningful efforts to prevent, control, and abate environmental pollution; and to support the development of programs to enrich the understanding, protection, and development of ecological systems and conservation of natural resources important to the well-being of the Nation."

Obviously, this policy statement is so broad and general that it provides little or no guidance to USDA programs. By September 1, I plan to develop a new policy statement which will emphasize the use of nonchemical measures in integrated pest management systems, as encouraged in the President's statement. This policy will be specific and contain examples to guide its interpretation. In developing this policy I plan to seek the advice and counsel of anyone who would like to give it. I've asked Mr. David E. Ketcham of my staff to coordinate this effort. If any of you should have suggestions, please contact Dave.

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As a part of this process, I plan to review the use of pesticides by the Forest Service who, because of the national forests, is the Department's biggest user. This process will begin the week of July 5.

Research, Development, Education,
Regulatory, and Action Programs

Over the years the Department has strived to maintain a balanced program on pests and on the management of pest problems in its research, development, education, regulatory, and action programs. Our research efforts include such things as research on pest biology and ecology; alternative methods and systems of pest management; new use patterns of pesticides with reduced hazard to man and to nontarget species; toxicology, behavior, and fate of pesticides in the environment and in exposed organisms; and economic and environmental impact of pest management. However, in order to develop and implement appropriate integrated pest management systems, the Department must intensify its efforts to:

- accelerate the development of control tactics of all kinds -- biological, cultural, host resistance, environmental, and chemical -- that preserve the ecological and genetic diversity
- develop improved pest detection, appraisal, prediction, and loss evaluation procedures
- develop simulation models and systems methodology
- assess and evaluate the economic benefits of the parts and whole of any integrated pest management system and make this information available

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- accelerate the use of integrated pest management systems in extension and action programs.

Probably one of the Department's most progressive moves in recent years in the area of pest management was the Extension Integrated Pest Management Program which was initiated in 1971. The objectives of this program are to develop and implement an effective, integrated program to prevent or mitigate losses caused by pests through the use of biological, cultural, chemical, and varietal methods of control; develop methods for monitoring pest populations in farmers' fields; and provide producers, consulting firms, and farmer cooperatives with information and training in the principles of integrated pest management.

The goal of the Extension education pilot project is to teach farmers, ranchers, and homeowners how to carry out more effective pest controls; protect natural enemies; implement, where feasible, nonchemical means of controlling pests; and apply pesticides on an "as-needed" basis.

The accomplishments of this program provide us with some good illustrations of the types of benefits that we can reasonably expect from other integrated pest management programs. For example, the Extension Service found that growers in a cotton insect pest management program typically averaged two to four fewer insecticide applications than nonparticipating growers. This represented about a 35 to 50 percent reduction in insecticide use and net profits of \$25 to \$95 per acre, depending on insect population densities. The pilot pest management projects on other commodities have shown that pesticides can be reduced 30 to 70 percent in situations where unwarranted or poorly timed applications have previously occurred. Depending on the pest complex and crops involved, benefit-cost ratios of four to one to ten to one have been realized.

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The Extension Integrated Pest Management Programs are cooperative programs with the involved States, and the States deserve a lion's share of the credit for making these programs go.

A number of States have demonstrated prototype predictive models to more accurately forecast local pest outbreaks and provide farmers and pest management advisors with better decision-making capabilities. There is increasing acceptance of the programs and a willingness of farmers to pay the cost of monitoring field populations of pests, either by hiring consultants or by forming grower-owned pest management cooperatives.

An outgrowth of this pilot pest management program has been the development of many training and informational materials. States have developed educational materials to meet their local needs. The Extension Service-USDA, working cooperatively with the States, has developed educational publications and teaching aids for diverse audiences.

Many Extension-trained professionals have entered the private consulting business or are working for cooperatives and the pesticide industry. The thousands of rural youth who have been trained as pest management scouts will become better farmers. Many are pursuing professional careers in the public service or are working in the private sector where they are creating profound changes in attitudes about pesticide use.

In 1973 less than 100 private consultants were offering pest management advisory services to farmers. Today, the number exceeds 500. Before Extension undertook this program, fewer than a dozen service cooperatives provided any kind of integrated pest management advice. Today, several dozen cooperatives and farm management firms provide pest management services. More are developing this capability as trained professionals become available.

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Many States have developed improved pest diagnostic facilities such as mobile laboratories and diagnostic clinics. Most States conduct specialized courses on identification of pests and provide instruction on latest recommendations to pest control operators, aerial applicators, and pesticide salesmen. Growers are advised on selection of resistant varieties, cultural practices, and when to spray. Clinics are also held in a number of major cities to inform homeowners and home gardeners. The subject matter is interdisciplinary, involving plant pathology, entomology, weed science, and nematology. Extension plant pathologists have organized on a regional basis for the purpose of reporting and forecasting epidemics of diseases such as wheat rust and blights of corn, tomatoes, and potatoes.

Pest control education for farmers, especially for small farmers, can be improved in the future as more rapid communication systems are perfected and procured. Foremost on the list will be the development of English language computer programs that will make available information and solutions of complex pest problems at the county office level, which now requires consultation with Extension specialists or other university technical personnel. Better agricultural weather information, combined with developing new technologies for forecasting and predicting outbreaks of pests, will improve pest control and further advance integrated pest management programs. Farmers will receive more sophisticated and precise information on how to manage pests and reduce losses, thereby increasing agricultural production and contributing to a better environment.

The State Cooperative Extension Services will provide training to growers, scouts, and private organizations who offer advisory services to farmers, rather than relying on manufacturers' representatives and salesmen of

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pesticides. The State Extension Services will provide participating growers, other farmers, home gardeners, consulting firms, and chemical industry fieldmen with educational materials and information on integrated pest management. Public funds will be used only to pay professional Extension costs; develop and purchase publications; provide program support in the form of supplies, clerical assistance for data collection, processing, and forecasting of pest populations; and develop specialized communication and monitoring equipment.

An outgrowth of this program will be the creation of new job opportunities. Thousands of youth will be provided training, summer employment, and career opportunities.

Another special effort within the Department is the Combined Forest Pest Research and Development Program. This program is unique in the sense that this is the first time an interagency research and development program has been administered directly from the Office of the Secretary. I also think that the participation under one administrative organization of four agencies in the Department -- Agricultural Research Service, Animal and Plant Health Inspection Service, Cooperative State Research Service, and Forest Service -- with State agricultural experiment stations, universities and colleges, State forestry organizations, and private industries represents a milestone in Federal, State, and private cooperation.

The ultimate goal of the program is to provide the necessary tools for an integrated pest management system designed to minimize intolerable losses caused by the gypsy moth, the Douglas-fir tussock moth, and the southern pine beetle.

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After almost three years of operation, the program has made some notable accomplishments. In August 1976 the nucleopolyhedrosis virus was registered by the Environmental Protection Agency for use against the Douglas-fir tussock moth. This was the first virus to be registered for the control of a forest insect, and it represents the culmination of thirteen years of research and development. An application for the registration of a similar virus for the control of the gypsy moth was submitted to the Environmental Protection Agency in December 1976. Another biological agent, Bacillus thuringiensis, was registered for aerial and ground application for the control of the Douglas-fir tussock moth. Excellent progress is also being made in using pheromones for the detection and evaluation of Douglas-fir tussock moth and gypsy moth populations, determining the impacts of native and introduced parasites and predators for all three insects, identifying the factors which affect forest stand susceptibility to insect attack, and developing procedures for measuring and predicting impacts.

The Gypsy Moth and Douglas-Fir Tussock Moth Programs will have completed their work and be disbanded in September 1978. The Southern Pine Beetle Program is currently scheduled to complete its mission by September 1979; but it may be extended for one more year to complete, report, and implement the new technology.

During the last few months of these programs, we plan to contract with an outside firm to evaluate the Combined Forest Pest Research and Development Program and its approach to doing research and development. One key area that will be explored is the accomplishment of the accelerated program as opposed to what could have been accomplished on a business-as-usual basis. This process will begin during the summer of 1978 and be completed following the phaseout of the Southern Pine Beetle Program in September 1979 or 1980.

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New Initiatives

During the past few months, the Department has taken a number of new initiatives and others are being considered. One of these is the national pesticides assessment activity which is designed to provide maximum assistance to the Environmental Protection Agency in carrying out the process of reregistering pesticides as required by the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. In this area the Department will develop thorough and objective assessments of the benefits and risks associated with the use of various pesticides. Our main interest is directed towards assisting EPA in making informed decisions so that both the needs of agriculture and the well-being of consumers will be thoroughly considered.

On April 8 Secretary Bergland established a work group on pest management. This work group is made up of representatives from the USDA agencies which are engaged in active programs directly involved or supportive of pest management. This work group is chaired by my Deputy Assistant Secretary, Dr. Jim Nielson, and is charged with the job of providing leadership and information exchange among the agencies involved. It is also responsible for taking the lead in coordinating USDA activities on pest management with those of EPA and other Federal and State agencies.

The Department also sponsored a special team to study the potential uses of biological control agents. The team was composed of representatives from USDA agencies, State universities, State departments of agriculture, and the Agriculture Research Institute. This study group has just completed a report, "Biological Agents for Pest Control; Current Status and Future Prospects," which the Department will publish. This report highlights a number of opportunities for the expanded use of beneficial arthropods, nematodes, snails, micro-organisms, and vertebrates for suppression of all kinds of pests.

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We're now considering how we might best implement the recommendations in this report in order to increase activities among all concerned interests in the research, development, and use of biological agents in the management of pest problems.

Another area to which we're giving increased emphasis is in the use of systems science in developing and implementing approaches to manage pest problems. The systems approach forces our scientists to consider pest management as an integral part of total crop or resource management.

The old way of doing business "down on the farm" usually involves the systematic application of pesticides at set intervals, whether they need it or not. In order for farmers to accept and implement new techniques, they need assurance that the system will work and that it is economically sound. They know the old way works. They also know that financially they can't stand to lose a whole year's crop. Nature presents many unavoidable risks to the farmer's successful production of a crop. One way to encourage growers to accept the higher perceived risks of pest management systems is through an appropriate program of crop insurance which will provide adequate protection against pest losses. The Federal Crop Insurance Corporation insures most field crops on an all-risk basis in order to guarantee the producer the return of production costs. The program does not provide insurance for poor farming practices or neglect of the crop. Considerable indemnities have been paid for pests such as the pink bollworm and western corn rootworm. Congressman Jones of Tennessee has introduced legislation that would substantially broaden the scope of the farm protection.

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Summary and Conclusion

To summarize briefly, we plan to take several actions within the next few months which will have a major influence on the Department's pest management activities. These include:

- the development by September 1 of a new policy on pest management which will emphasize the use of nonchemical measures in integrated pest management systems; this policy will be specific and contain examples to guide interpretation
- review of the use of pesticides by the Forest Service to assist in the development and implementation of USDA policy
- the utilization of the unemployed in pest management activities as an alternative to the use of pesticides, where possible
- the expansion of the Extension Service's integrated pest management programs to make pest management technology available to more farmers, ranchers, and homeowners
- the evaluation of the use of accelerated research and development programs to provide pest management technology for critical problems within a short period of time
- the full support of our continuing research programs which are the backbone of our research and development effort
- the expanded use of biological control agents in those areas where possible and appropriate.

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So, as you can see, the USDA has a major role in integrated pest management. However, this role is broader than our research, development, technology transfer, and action programs. It also includes the obligation of providing responsible leadership in the use of integrated strategies in all areas of agriculture and natural resources. This is an obligation we intend to fulfill.

Another obligation that we see is that of working closely and cooperatively with the Environmental Protection Agency, other agencies, States, industries, groups, and associations to accomplish our mutual goals. I mention EPA in particular because of our closely related interests in the pest management field. If we are both to redeem our respective responsibilities, we must work closely together as a team rather than as adversaries. If we've got real differences of opinion on particular issues, and I'm sure we will have, then we're going to sit down together and work them out. We must keep the lines of communication open and show the people of this country that big government can not only be sensitive to their needs but that it can also be responsive.

We're looking forward to working with each and every one of you and welcome your advice and counsel.

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